530,417

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
15 April 2004 (15.04.2004)

PCT

(10) International Publication Number
WO 2004/031325 A1

(51) International Patent Classification[7]: C10B 57/04

(21) International Application Number:
PCT/PL2003/000102

(22) International Filing Date: 7 October 2003 (07.10.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
P 356498 7 October 2002 (07.10.2002) PL

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(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHOD FOR UTILIZATION OF RUBBER WASTES BY SIMULTANEOUS PYROLYSIS WITH COAL

(57) Abstract: Method for utilization of rubber wastes with simultaneous carrying of pyrolysis of coal in cells of a coke oven battery, in which each consequent cell is filled with previously prepared and disintegrated blend of coke coals of a size of particles 0,1 - 5,0 mm in amount of 95 -99 % by weight a rubber granulate is added in a form of a rubber grain of a size of particles 0,1 - 5,0 mm in amount of 1 -5% by weight, and thus formed mixture of coking coals charge and rubber grain is thickened by a mechanical compacting till an uniform structure of a whole charge is obtained, and then a process for utilization of rubber wastes is carried out in a closed system without an access of oxygen in a temperature of at least 900°C with a simultaneous pyrolysis of coal.

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METHOD FOR UTILIZATION OF RUBBER WASTES BY SIMULTANEOUS PYROLYSIS WITH COAL

The subject of an invention is a method for utilization of rubber wastes with simultaneous carrying of pyrolysis of coking coal, particularly compositions of various coking coals in the cells of a coke oven battery.

Hitherto rubber wastes in a form of the used rubber products such as car tires, tubes, conveyor belts, hoses etc. are subjected in a limited range to the mechanical manufacturing to obtain so called "grinding product". However, a remarkable majority of rubber wastes is directed to waste dumps or it is burned in the opened air, in an access of oxygen in a waste combustion plants or in a rotary furnaces in cement factories.

Carrying of such an utilization causes a contamination and degradation of the natural environment and a lost of valuable components, which can be reused for rubber articles production.

The method for utilization of rubber waste with a simultaneous carrying of coking coal pyrolysis, comprising filling of consequent cells of a coke oven battery with a charge of a previously

prepared and disintegrated blend of coking coals according to the invention is characterized in, that to each charge of the blend of coking coals of a size of particles 0,1 – 5,0 mm in amount of 95 –99 % by weight a rubber granulate is added in a form of a rubber grain of a size of particles 0,1 – 5,0 mm in amount of 1 –5% by weight in coking plants with a compacted system of filling the cells. In coke plants with a gravitational charge filling system preferable size of particles is between 0,1 – 20,0 mm. Formed in this way mixture of coking coals charge and rubber grain is thickened by mechanical compacting till an uniform structure of a whole charge is obtained. A process for utilization of rubber wastes is carried out in a closed system without an access of oxygen, at the temperature of at least 900 ^{0}C with a simultaneous pyrolysis of coal.

The advantage of an invention is a remarkable decrease of the emission of harmful products, formed hitherto as a result of a combustion of rubber wastes, which was carried out with an access of oxygen in opened systems, a decrease of contamination and degradation of a natural environment, an elimination of wastes, and, moreover, a recovery of carbon derivatives, which can be

reused directly in a chemical industry, including rubber articles production.

Example 1

A blend of coking coals is prepared and disintegrated in a ball grinder provided with an appropriate sieves to obtain the grain size of 1 - 5 mm. The above mentioned blend of coals is placed in amount of 14.850 kg in one cell of the coke oven battery. Then, 150 kg of rubber grain of the particles size 5 mm are added to the coal blend already placed in a coke oven battery cell. The composition of coke coals and rubber grain is compacted mechanically to obtain a homogenous structure of all the charge. In the same way filling of other cells of a coke oven battery is performed, using siloes containing previously prepared and disintegrated coke coals composition and rubber grain.

After filling of the cells is completed a process for utilization of rubber wastes is carried in a closed system without an access of oxygen, without forming wastes, in a temperature of 900^0C, with a simultaneous pyrolysis of coal.

When finished, a process for utilization from each cell of a coke oven battery yields with: coke in amount of 11.400 kg,

ammonia – 35,25 kg, benzene – 183 kg, tar – 745,5 kg, coke oven gas – 5.034 Nm.

Example 2

Proceeding as in Example 1, each coke oven battery cell was filled with a coal composition in amount of 14.550 kg and rubber grain in amount of 450 kg.

After a process for utilization of rubber wastes is completed, the following products are obtained from each cell: coke in amount of 11.460 kg, ammonia – 35,25 kg, benzene – 183 kg, tar – 745,5 kg, coke oven gas – 5.043 Nm.

As it can be concluded from the above examples, depending on the ratio of rubber grain and a coal blend, the process for utilization of rubber wastes with a simultaneous pyrolysis of coal yields, according to the needs, with controlled, various amounts of products.

Patent claim

Method for utilization of rubber wastes with simultaneous carrying of pyrolysis of coal in cells of a coke oven battery, in which each consequent cell is filled with previously prepared and disintegrated blend of coke coals, characterized in, that to each charge of the blend of coke coals of a size of particles 0,1 – 5,0 mm in amount of 95 –99 % by weight, a rubber granulate is added in a form of a rubber grain of a size of particles 0,1 – 5,0 mm in amount of 1 –5% by weight, and in a gravitational charge filling system preferable size of particles is between 0,1 –20,0 mm, and thus formed composition of coking coals charge and rubber grain is thickened by mechanical compacting till an uniform structure of a whole charge is obtained, and then a process for utilization of rubber wastes is carried out in a closed system without an access of oxygen at a temperature of at least 900 ^{0}C with a simultaneous pyrolysis of coal.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/PL03/00102

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C10B57/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 C10B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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"A" document defining the general state of the art which is not considered to be of particular relevance

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
20 January 2004	30/01/2004

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Zuurdeeg, B

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

International Application No
PCT/PL03/00102

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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